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ENHANCING CREATIVITY AND INDEPENDENT LEARNING OF ARCHITECTURAL TECHNOLOGY STUDENTS THROUGH THE USE OF A REAL LIFE DESIGN COMPETITION MODULE

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Abstract

Upon request of the Architectural Technology Students, we developed a module that used a real-life competition design project at its core. Developed with sustainability and environmental awareness in mind, the students were required to evaluate the site, materials and energy of their designs and, competing as groups, adapt them to maximize the functionality of the brief. This module enabled students to gain insight into collaborative processes, both with each other as well as others in the design team very early in their professional education. The brief set enabled students to increase their knowledge and research skills and through Kolb's cycle of action and reflection, encouraged them to find help not only within the department but also outside of the course, promoting interdisciplinary collaboration and a broader understanding of the real-life design process. The two finalists then had the experience of an actual client and design team presentation, followed by the judging panel questioning them about their work before deciding on the winner. This paper gives both staff and student viewpoints of the project and process as well as outcomes of the experiment and introduces a new model of using a real-life project competition to enhance the learning of Architectural Technology students.

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INTRODUCTION

The construction industry, and design in particular, is based on working in teams, with both communication and feedback (Bennett et al., 2006). A typical construction project is inherently complex and cannot be designed and built alone, yet some traditional architectural design studios teach design in isolation with no input from other design colleagues or other built environment professionals.

This project was designed upon specific requests from the First Year Architectural Technology students to have another design project in the second semester following on from their taught design module in semester 1. We developed a module that used a real-life competition design project at its core as an experiment to engage the students and enhance their learning.

Aware of industry's growing demand and the need to adjust the teaching program to the ever-changing market, we have developed a new experimental teaching style which allowed us to deliver a more real-life-focused teaching style which revolved around real emerging opportunities in the construction market. Through the development of group-oriented teaching modules requiring students to provide their own site surveys, research and insights into redevelopment or new build structures, we have achieved a more successful and progressively more advantageous approach to education. Through constant exposure to industry professionals and their involvement in the judging process, the students have acquired a competition-based mindset which is necessary in the highly competitive world of today.

During this time, a marked increase in student engagement has been observed, which resulted in delivery of more profound and professional work from students early in their education. By having equipped them with adequate mind-set; allowing them to develop soft skills through the presentation process and the constant exposure to group work; and the additional stimulus of the reality of working on an actual project that will have the chance to be judged by the owner of the site, students have produced an overall higher and more satisfactory work standard compared to groups who have not been exposed to this teaching style in the past years.

By introducing real local briefs which are tied not only to their education but will have an impact on the shape of the city, students have constantly observed the changes in the progress, preparing them for modules in next years, allowing them to begin their work on Town Planning and Architectural Development with a more profound background knowledge and the correct approach from day one. This results in a series of well-prepared projects that take for certain not only the sustainable approach into construction, but also focus on more details that have not been mentioned in the brief, naturally stimulating students to perform their own research and seek to solving their problems outside of the department.

A marked change can be seen even in highly theoretical subjects such as Architectural History, which instead of being just a secluded part of Design Studies is perceived as an active and living part of the active design process. The knowledge actively pursued in those sessions (through persistent questioning) has been applied to the very designs in the second entry to the Trada Competition this year, yielding even more profound, advanced and considerate pieces of work in Year 2.



LITERATURE REVIEW

Architectural education tends to be project based, with simulated real life projects (Roberts, 2007), and Architectural Technology courses are starting to use a similar approach. Dr Vicky Gunn states that students can benefit from research teaching linkages as they learn new skills through real life examples (Gunn, 2010). Academics' links with employers also benefits students when they leave their studies, while students' interaction with professionals in their discipline increases the disciplinary 'way of thinking' (Gunn, 2010). Working on projects collaboratively can improve students' learning and 'Active involvement in learning helps the student to develop the skills of self-learning while at the same time contributing to a deeper, longer lasting knowledge of the theoretical material' (Wilson-Medhurst & Glendinning, 2009). Parnell and Iyer state that 'the peer discussion method has a positive effect on students' learning processes' (Iyer, 2015) and that 'students develop higher quality cognitive strategies cited as necessary for the management of disjunction' (Parnell, 2001).

There is a growing body of literature to acknowledge the benefits of "Activity Led Learning (ALL)" especially within Coventry University (Wilson-Medhurst and Glenning, 2009). The aim of ALL is similar to that of "Problem Based Learning (PBL)" (Roberts, 2007) where students are given tasks involving problems or issues and asked to resolve the scenarios as part of a project to enhance learning rather than the traditional approach of lectures and examination. Nicholls (2002:12) also refers to these three approaches as closed, framed and negotiated approaches. Using a design project as part of a module utilises all three of these approaches, encouraging independent learning.

Maturana (2014) describes how the design studio is modelled around problem-solving rather than a problem that requires a design solution. Within this real life project we were able to merge these thoughts in a way that embraced the best capabilities of our students within the technical, firmness and delight forms of architecture. Maturana goes further to state that the 'real world and the world of architectural practice' are not lacking in problems (including climatic changes) and that 'design problems offer the opportunity to respond in a creative and responsible manner that demonstrates our commitment to a public-spirited education, the wider society and the world.' The TRADA project become the ideal opportunity to tick all of these issues and ongoing could become an exemplar of our additional work projects for years to come.

'Currently universities are abuzz with a call for more interdisciplinary, multidisciplinary, or transdisciplinary work. Many administrators in architecture are jumping on the bandwagon.' (Forsyth, 2007) As our students complete a lot of this type of group project as standard in their course, our students asked for more discipline specific high-quality challenges, using our space in our design studio as a base for working, learning and a space where constant feedback could be sought.

RIBA and Architects Journal websites promote the use of competitions in architectural practice, however there is little written about the use of architectural competitions in education. Verhoeff states that 'the beneficial effect of a competition derives precisely from the fact that it is a change from the regular curriculum' (Verhoeff, 1997) and Sara acknowledges that external involvement produced by real life projects offer work of value to the client/user group with the process 'more dialogic and inclusive than traditional studio projects, allowing and embracing alternative voices in the studio environment' (Sara, 2006). We therefore chose this approach to develop and inspire our students to achieve the best that they could and gain benefits that would help them throughout their careers.

PROJECT DESCRIPTION

The design project chosen was that of the Arboreal competition design brief provided by TRADA. The original competition was launched by TRADA in September 2015, with entries to be uploaded by June 2016. The brief was to design a flagship timber structure for Arboreal at the Sylva Wood Centre in south Oxfordshire, with emphasis on being creative, technologically advanced and inspirational.

Students were therefore asked to:

1. Design a new two storey timber structure to serve as a multi-use building, housing offices, seminar space, exhibition space and a field laboratory (noting that the existing buildings will be taken down to make way for the brand new Arboreal building).
2. Incorporate cutting-edge materials and technologies throughout to act as inspiration to visitors and users, with emphasis on sustainability and low energy design.

To fit in with the timescale of the semester, the project was condensed into an 11 week timeslot, with a series of briefings, site visits and inspirational lectures and sessions from other disciplines. Using a real-life brief and speaking to a real-life client, the students were encouraged using a problem based approach to develop a collaborative design in teams that would not only fulfil the brief but also to work together to simulate real life practice.

This was a purely optional module, however the use of a competition as a brief worked as an incentive for the students to learn and develop their research, investigation and collaborative skills based on real life links with industry. Although the module was not mandatory, the whole class willingly participated regardless of the workload from other formally marked modules in that semester, and two teams were shortlisted internationally.

Using Kolb's cycle of action and reflection (Moon, 2003), the project was set up similarly to a standard design studio module, with a series of interim design reviews with the first addressing site, precedent and process analysis including investigation of the brief, with subsequent reviews focusing on design and sustainability of materials. During the review processes, the conceptual designs were thoroughly questioned and under creative scrutiny were required to adapt to the brief in a more functional manner. The final review looked at finalised designs, details, structural analysis, application of feedback from interim design and seeking help from outside the department. The client was involved in the initial stages, and interim assistance was available from the TRADA representative. Thanks to the high frequency of reviews and the resulting engagement from students, the design project has been led in the spirit of creativity and innovation under a watchful eye of industry experienced professionals to ensure functional and real life-relevant final output.

All student teams were entered into the final competition stage of the project to compete against worldwide entries from differing courses and year-groups. Two were selected to be in the final six where they had to complete a final presentation and interview with the judging panel, composed of industry representatives, clients, manufacturers and engineers.



STAFF VIEWPOINT – HEATHER BIBBINGS AND CARL MILLS

Time management

From a staff point of view, the project took up a lot of time both to investigate the project and to set up the links, and work with the TRADA industry and other disciplines. The timetable needed close organisation to ensure that there were no clashes with the other marked modules, and to gain the buy in of other staff members from different disciplines involved a lot of negotiation for the benefit of the class. As the students had a lot of other projects to complete simultaneously, the project had to be carefully micromanaged to ensure that the students met their marked goals as well. Figure 1 demonstrates the additional sessions that were included in the weekly timetable on top of the current workload for both staff and students.

180CAB+ - Architectural Technology Year One - Semester Two					
Teaching Wk	Date	Monday 10-12	Wednesday 11-1	Thursday 10-11	Weekly output / Coursework
T1	18/01/2016	Intro - Barcelona and Project Brief	Site visit Coventry- Visitor centre, Drapers, Herbert, Fargo	Linking hand drawn plans, elevations and model pictures with Photoshop and Illustrator	Brief handout
T2	25/01/2016	Finding precedents (AM) / Interrogating brief/ Passports/ Studio	Enthusiasm about timber (DT) / Information from journals (HB)/ Studio	Linking Sketchup and AutoCAD with Photoshop and Illustrator	
Saturday 30/01/2015 - Trip to site and Oxford - 9am leave from Fairfax street					
T3	01/02/2016	Aalto (AB) / Studio	Studio	Building a database	
T4	08/02/2016	Initial concept design/site analysis/precedent & inspiration review (hand drawn)	Barcelona CGE funding/ Seminar	Floor plans and site plans	Stage 1 Concept review
T5	15/02/2016	Notice of intent fill in/ Barcelona/ Studio	What makes a good drawing? (PS) / Studio	Sections and elevations	
T6	22/02/2016	Construction details (CM/MW) & Studio	Timber details / TRADA (DT) / Studio	No session due to labs	
T7	29/02/2016	Interim design review		Outdoor renders from Sketchup	Stage 2 Interim review
T8	07/03/2016	Model photographing/ Detailing/ Studio	Environment/ Detailing / Studio	Nature render from Sketchup	
T9	14/03/2016	Final Presentation / Crit Week		Diagrams	Stage 3 Final review
T10	21/03/2016	Barcelona/ Exhibition intro	Final report hand in	Portfolio and CV	Stage 4 Final report handin
EASTER BREAK					
T11	18/04/2016	Exhibition preparation	Exhibition preparation/ Barcelona	Discuss portfolio and CV	Exhibition/ Barcelona
Note: Monday - lecture/tutorial Wednesday - lecture/tutorial Thursday - skills					
May Monday 09 May - Friday 13th May Rugby surveying project - Attendance required all week for all year 1 students					
May Sunday 15th May - Thursday 19th May Barcelona study trip					
May Monday 25th - Wednesday 27th May Exhibition					

Figure 1: Timetable of project to be fitted into a single semester (Source: Authors).

Departmental links

Following the success of the first competition review, we invited the whole department to see the work which was left pinned up in studio. Other staff members were impressed with the hard work, asking if they could be involved and offering assistance. This strengthened links across the university and increased the profile of the course, especially with management. Stephen Austin, the Head of School, nominated the course team for a University prize commenting that "The pedagogical change within the Architectural Technology course is having real benefit on the student experience and the performance of the students. Module satisfaction has significantly increased in year 1 to the extent that students have voluntarily undertaken an Industry linked project, outside of their normal course of studies which has received strong praise from the industry sponsor and staff alike. I fully support this application for outstanding course team due to the positive impact the initiatives the staff are undertaking are having on the students.". There were, however, others who felt threatened

by the success of the project and although there was a general feeling of achievement, there was no increase in workload because of it. There was therefore a large reliance on the goodwill of staff to complete time and work over and above their contracted duties for the wider benefit of the students and course.

Course profile

The profile of the course increased exponentially as a result of this project, both within the department as mentioned previously, but also outside the University. As we had so many entries from a single university, we had an area at the client site set up solely to showcase our work (Figure 3), and the students and staff found it to be very self-motivating to be acknowledged in this way. We also had a significant increase in profile of the course, both with the companies of the judges, as well as an increase in student numbers due to the high quality of the work received.

The largest measure of success was the attendance at the end of year show (Figure 2) which increased to 200 people, with representatives from TRADA, local businesses, and suppliers as well as other university staff, students and families. This resulted in an increase in admissions and interest in Open Days from prospective students as they were impressed by the use of a real life project with real life client and alternate discipline interaction opportunities.



Figures 2 & 3: TRADA Competition corner at the End of Year show and exhibition area at the premises of the client solely to showcase the work of Coventry University students (Bibbings, 2016).

Quality of work

The competition brought out the competitive side of the class, pushing them to achieve their goals and to collaborate through others. It was of a much higher standard than that of previous years' students (Figure 4 and 5) and their work has been on display within the building to entice people to see their designs and layouts. TRADA expressed that they were "impressed with the quality of both the displays and the actual designs your students have produced. It is comparable with and indeed better than some of the work I have seen from second and third year students". Overall it was a resounding success from an educational perspective.



Figure 4: Izzie Piorkowska and Jack Nolan presenting their design and work to the client at TRADA (Source: Bibbings).

STUDENT VIEWPOINT – PIOTR A. BIELUGA, ISABELLE PIORKOWSKA, JACK NOLAN

Bonding

All students commented that the introduction of the extracurricular module into the A.T. studio environment last year has brought about new challenges as well as new opportunities we did not have before. Piotr Bieluga commented that "because of the teaching style and strong focus on group work at Coventry University, we already had a chance to bond as class, but now with an added perspective of actual, internationally recognized competition ground we found a chance to not only push the boundaries of our knowledge and design, but in an indirect way to work together as one big group. Realizing that each person has their own unique strengths meant that soon after beginning the project we started collaborating with other groups participating in the challenge – sometimes in search of solutions, sometimes looking for help with manifesting ideas and other times to have someone challenge our design". Izzie and Jack commented that as a direct result of the teamwork and process experienced during the competition, they hope to "work to open a firm together in the future".

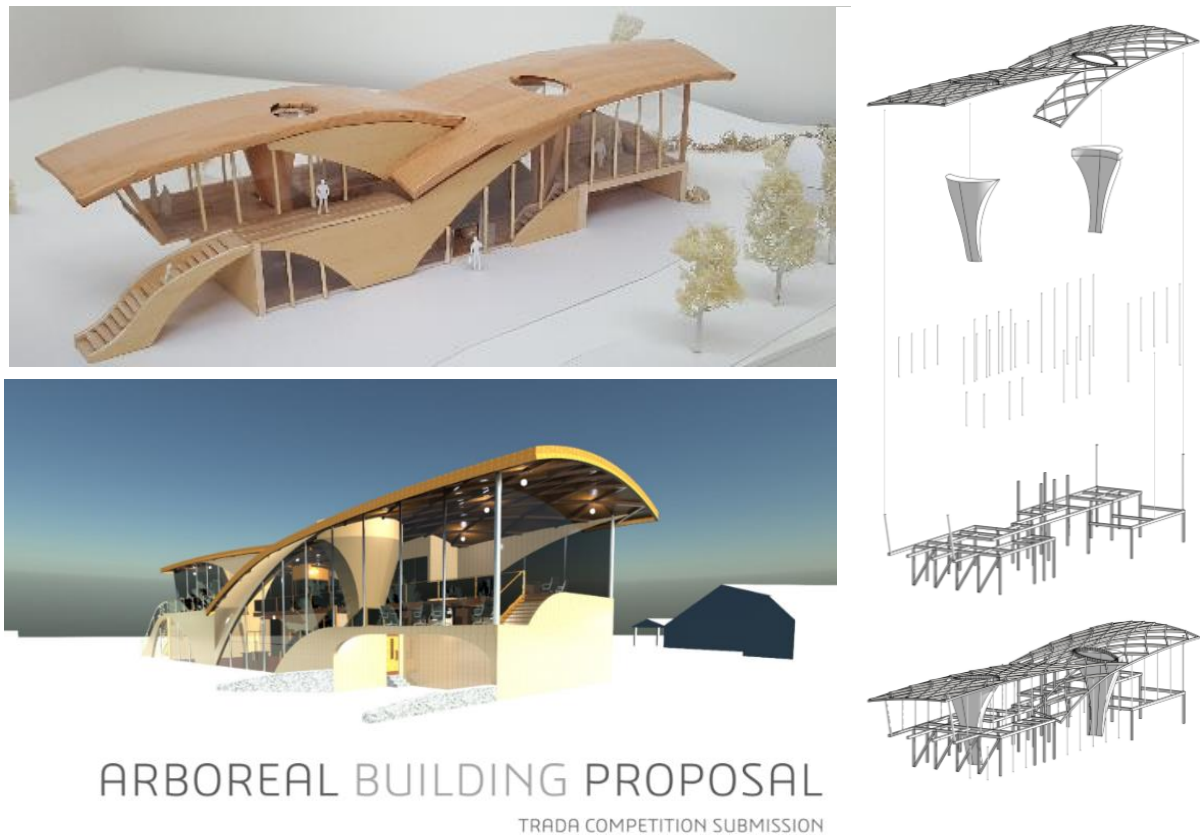


Figure 5: The award winning design by Piotr Bieluga showing structure and models of design (Source: Bibbings).

Confidence

Without realising it at first, we have created a busy, goal-oriented real life team of driven individuals who thrived in a collaborative environment – almost as if we were in an actual firm. “This gave us a chance like no other to develop designs for a real, tangible purpose, boosting the morale and motivation of near everyone in the class” commented Piotr Bieluga. Jack Nolan commented that ‘Starting this year having a very basic knowledge for architecture to 9 months later and knowing how all these structures work, come together, the materials and having an appreciation for all trades in the business, this first year at university has taught me so much and given me a lot of knowledge for future years’. All students were inspired and enlightened by the project and felt that they had learnt a lot about designs and themselves as a result of the competition process.

Collaboration and achievement

“Soon it became apparent that creating a successful design which was not only aesthetically pleasing and technically coherent, but was also equipped with a sound structure required us to extend beyond the current knowledge we possessed and lead us to seek new solutions elsewhere” commented Piotr Bieluga. “Due to particular construction challenges that my design was posing, I had to reach out outside of our department and speak with structural

engineers, experts on timber construction and sound insulation as well as sustainability in order to ensure that all of those fields have been covered in an effective and professional manner. In the end, the design has received a Highly Commended award, which for a Year 1 Architecture student who had not worked in a design field before felt like a great achievement”.



Figure 6: Students and staff working together on the project on site and in studio (Source: Bibbings).

Isabelle Piorkowska and Jack Nolan were inspired to voluntarily write an article about their experience, which was praised by the editors of the Aspiration team and subsequently published in Aspiration CIAT Magazine.



Figure 7: Staff and students at the TRADA awards final with the shortlisted designs (Bibbings, 2016)

Benefits

All students involved in the project felt that it had been beneficial for their personal and architectural development. Piotr Bieluga commented “Looking at it from a perspective, I would not be where I am, had it not been for the chance to prove myself outside of the University and the hours upon hours which this project has enthused me to put into deepening my own knowledge, skills and broadening the way I think about design”. Izzie added that “Although we didn’t come home with a prize, Jack and I felt like winners. We stood by our design idea through the entire journey and as the Hedron grew, so did we, as architectural technologists and as people. The opportunity to present to the TRADA judges was one we value highly and we will hopefully be competing together again next year.” All work was shown at Timber Expo 2016.

CONCLUSION

By observing the students’ performance in Year 2 of their education and comparing it to the work of previous second and third years, in retrospect the experiment has clearly enhanced both their knowledge and willingness to broaden it at their own incentive, and they appear to have developed a habit of pushing their boundaries further, with a clear mindset of high performance and technical accuracy in their work. In addition to that, the university has created beneficial connections with local companies who cooperated with us during the projects throughout the year extending to other modules as well.

Now, students who decide to go on a year abroad, thanks to their well-developed portfolios, software skills, collaboration with other disciplines and their soft skills, all of which were developed as a result of this new experimental program of teaching, are very successful in gaining placements and job opportunities. We have witnessed this trend in the current year and being dedicated to helping the new undergraduate students this year to participate in similar programs (design of a school building), a stable and significant progress in the

standard of work is noticeable across the board. The students acquire knowledge quicker and with much more enthusiasm thanks to being able to relate it to real life and understanding that they will use it not only to get a good grade, but also – hopefully – for the rest of their lives.

Collaborating with students from other courses and departments, which is common practise at Coventry University (Bogdanovic et al, 2016), has revealed that the Architecture Technology students are doing comparatively much better with applying the knowledge they have, taking leadership roles in their new interdisciplinary teams and providing knowledge even from outside their specialisation – be that structural integrity, sustainable materials and practices or law requirements.

From the implementation of the process, it became apparent that it is very time demanding – both from the staff and students - as it requires additional planning and organisation from both sides. The time and effort put into the project, however, does significantly produce the benefits in the form of professional and educational progress of students, much better preparing them for real life challenges and equipping them with all necessary skills which normally would have the acquired in later years, during a placement or when already working in the industry. Instead, those skills are honed and practised now, greatly enhancing the students' employability and marking a significant milestone in their overall development. For these reasons we will be continuing this experimental method in the forthcoming years.

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